THE VETERINARY RECORD

A Weekly Journal for the Profession.

No. 649. DECEMBER 15, 1900. Vol. XIII.

Inoculation against Rinderpest.

The importance of this subject has been so strongly impressed upon stock-owners and governments that we are glad to be able this week to reprint from Dr. L. Rogers' Report a full extract. The work done in South Africa may perhaps be somewhere reported but only very limited notices of it have come our way. Dr. Rogers' report is of course on work done by him and his assistants in India. From this we hope later to make extracts. What we quote this week is a clear, masterly summary made by Dr. Rogers and used by him as an introduction to the report on his own original research. It commences with Koch's discovery of the action of bile taken from a diseased animal. Then Edington's glycerine-bile method is discussed, and finally the different methods of using serum, both as a preventive and a curative agent, are analysed.

Possibly, if rinderpest ever again invaded this country, we should not adopt inoculation as the surest and quickest way of stamping it out. Our country is so closely populated, distances so comparatively slight, and local authorities so thoroughly organised that compulsory slaughter would be adopted without hesitation. In such dominions as India and South Africa other conditions obtain. Slaughter there encounters many difficulties and involves many disadvantages. A reliable method of protective inoculation is therefore of urgent importance, and every veterinarian going abroad should know exactly what has been done and what is being done. The extract on page 316 will be found invaluable.

Reports of Cases.

Just before Xmas is hardly the time to ask practitioners to report any interesting cases they may have notes on. But really the dearth of clinical reports is becoming a serious question for veterinary editors. If we knew the cause we might suggest a remedy. We do not know it. Every reader prefers "clinicals" to other matter. No article is so easy to write—for it should be merely a statement of facts with a short explanation. Payment has been offered and made, but without good result. Thirty years ago the practitioner recorded interesting cases. Now that we assume to be more scientific and better educated we don't. What is the explanation?

"TWO CASES" (OF TWIST).

If only to relieve the monotony of reading the correspondence *re* "No Case" I venture to send you the account of "Two cases" which by a singular coincidence occurred in my practice at the same time, and which may prove interesting as illustrating what I believe to be an uncommon phase of an unfortunately too common condition, viz., "twisted bowel."

Case No. I.—On Tuesday, November 13th, I was called to a cart mare which had been unwell for three or four days, and which on examination I judged to be suffering from indigestion the result of a disordered stomach; partial loss of appetite, fœtid breath, pasty buccal membranes, slight grating of teeth being the only abnormal symptoms. There was no history of colic or abdominal pain so far as the knowledge of the attendants went. I prescribed accordingly and visited again on Thursday, Nov. 15th, when I found the mare apparently in exactly the same condition as on the 13th, still eating little, pulse, temperature, respirations, etc., still normal.

I continued treatment and saw the mare again on Saturday, November 17th, when I found her shewing symptoms of stoppage of the bowels, lying on her side, and when up walking backwards, pawing with fore feet, appetite quite gone, pulse indicative of pain, temp. 102. I prescribed aperient medicine with anodynes, and left instructions that I was to be sent for next day (Sunday) if the mare was still in pain.

I received a note on Monday morning saying that the mare seemed easier on Sunday so they did not send, and she was found dead on Monday morning.

The *post-mortem* revealed a twist of the double colon, about two feet of the anterior portion being twisted over from left to right sufficiently to have caused stoppage of the passage of ingesta but not sufficient to have caused strangulation, there being little or no discolouration of the bowel excepting at the twist, and there only on the attached portion. That part of the colon anterior (so far as the passage of the contents is concerned although posterior in position) to the twist was tightly packed with a mass of dry ingesta, as also was the cæcum, but the bowels posterior to the twist were comparatively empty. The colon immediately anterior to the twist was ruptured by the pressure of the contents, that evidently being the immediate cause of death. I examined the whole of the bowels most carefully for parasites but could not find any.

Case No. II.—On Sunday, November 18th, I was called to a cart horse which had eaten little or nothing for a week, but had shown no other symptoms

of illness and which had no history of colic until the present time, when it presented, as in Case No. 1 symptoms of stoppage of the large bowels. I therefore treated with aperients and anodynes, and on Monday 19th found the symptoms slightly aggravated, temperature higher (103·4). With inflammatory symptoms developing I gave unfavourable prognosis, and found the next morning, Tuesday 20th, that the horse had died during the night after showing severe pain.

The *post-mortem* revealed a twist in the same portion of the bowel as in Case No. 1, the difference being that the bowel was twisted from right to left. The twisted portion was much discoloured, being strangulated, and there was no rupture of the bowels although the contents of the cæcum and anterior portion of the colon were in the same condition as in the other case. I found two "ascaridæ" in the small intestines.

Judging from the history, symptoms and post-mortem appearances it is my opinion that the bowels were twisted in each case from the commencement of illness, and the condition must have been brought about during an attack of colic which occurred during the night or while the animals were not under observation; it is also a remarkable coincidence that two cases should occur in such close association. That and the fact that the condition is of such uncommon occurrence, must constitute my apology for bringing them before the notice of the readers of *The Record*.

Robert W. Clarke, M.R.C.V.S.
Beech House, Wragby.

SPINAL MENINGITIS.

By E. Wallis Hoare, F.R.C.V.S., Cork.

Subject.—An eight-year-old harness gelding, about 16 hands high. The animal had just been purchased and was sent to its destination, a journey of three days by boat. On landing here he seemed all right, but two days afterwards the attendant observed the animal to go a little "stiff" in the hind part. Next morning the stiffness increased to such an extent that he could scarcely be got to move out of the stable.

Clinical History.—On attendance I found the animal standing in the stall, and on being approached he seemed very nervous. The back was slightly arched, and on being touched he evinced acute pain; the tenderness was greatest along the lumbar region.

There was marked hyperæsthesia in the region of the flanks and quarters, after a great deal of difficulty the temperature was taken and found to be 101° It was then discovered that the animal had been recently "docked." evidently it had been done in an unskilful manner, as there was an unhealthy slough and the bone was very much exposed, showing an excessive use of the cautery. The animal resented being handled, and showed marked constitutional disturbance if approached, with greatly accelerated respirations.

The attendant stated that only a very small amount of urine had been passed, of normal appearance; on attempting to use the catheter, however, I had to desist as the animal would throw himself down and become very excited. After some difficulty I had the horse got out of the stall; he walked with the hind limbs spread wide apart and showed evident loss of control over the hind quarters; it was almost impossible to make him perform the act of "backing." When put into the stable again the animal appeared distressed, and kept rising each hind leg off the ground in an intermittent manner.

A guarded diagnosis was given, viz., probable injury to the spine, with a doubtful prognosis.

Hot applications were prescribed to the lumbar region; the owner had previously given a dose of spt. aeth. nit. At night the movements of the hind limbs continued, and the owner being positive that there was some kidney affection present and that the animal could not urinate, attempted to pass the catheter, but without any result, and the animal went down, but got up again.

On my visit next morning I found the animal dead. The attendant stated that death occurred after violent struggling about 3 a.m. The owner stated that the animal became gradually worse after my visit, the tenderness along the spine gradually extending up to the neck so that he showed pain on being handled along the shoulders and neck. He constantly forced his head into the corners of the stall, and eventually went down and struggled violently, also sweated profusely.

Post-mortem.—Internal organs healthy; the tissues of the tail at the docked portion showed extensive sloughing. The lumbar portion of the spinal cord was examined, it was of a reddish colour and congested in parts.

I regret that in consequence of the unfavourable surroundings it was impossible to make a thorough examination of the cord. Pressure of time prevented an examination of the brain.

Remarks.—I ascertained from the owner that on the day of arrival this horse had peculiar action in "turning round," *i.e.*, he crossed one hind leg over the other. I concluded from this that the animal must have been suffering from some affection of his spine of long standing; as nothing was observed until he was turned round. This fact I was not told until the termination of the case.

With reference to diagnosis, it was by no means easy to arrive at a definite opinion. The owner stated that only a small amount of urine had been passed at two intervals and that it was clear in colour; the animal had been exercised regularly but was not taken out on the morning in question; the muscles of the quarters although painful to the touch had not a cramped, hard appearance, so I concluded that the case was not one of Azoturia.

The question of acute nephritis suggested itself, but the absence of constant attempts at micturition (although the owner stated that the animal was constantly attempting to pass urine) the excessive pain on manipulation of the lumbar region and the loss of control over the hind extremities when walking, lead me to conlude, that nephritis was not present, even without examining the urine.

The *post-mortem* examination did not show lesions

in the cord such as would be expected from the severity of the symptoms, but I find on consulting Robertson's "Equine Medicine," that he says: "In some instances even after a careful examination, marvelously trifling changes are to be detected."

My experience is that in post-mortem examinations of acute cerebral and spinal affections, it is very difficult to detect morbid changes in the structures of the cerebrum or spinal cord. Of course our examinations are made generally in a kennel yard, and are of necessity crude, and no doubt if time and opportunity permitted, a thorough examination might be productive of more definite results.

With regard to the causation of the affection in the present case we are led to enquire if "docking" had anything to say to it.

We have the history of an excessive use of the hot iron in the operation, and an unnecessary burning of the tissues of the tail; then the probability of the animal having a previous spinal affection and having been a long time travelling by boat in very cold weather.

I should like the opinion of practitioners who have had experience in similar cases. I may remark that this horse had been passed sound quite recent to purchase.

ASSISTANCE AND CRITICISM.

The Veterinary Record helps a busy man to keep in touch of professional matters, but I often wish there was a query column where a subscriber could ask questions for guidance in matters which constantly crop up. I have no doubt there are others like myself, who have fallen behind in veterinary science, and do not feel able to write up cases of interest, and when they put a question in your columns do not get an auswer unless the subject is a controversial one. In the latter case they can bet on being slanged; there is but little profit however in these encounters, even to those who can write the bitterest things in the most elegant terms.

The pleasure afforded to lookers on is too much like that enjoyed by the witnesses of a street fight, and does not "tend to edifying" as certain divines would say. In making these remarks I do not pretend to clean hands, for I have my countrymen's love of being "in it" when there is a row on, but venture to think we might give one another a little more assistance, if we also engage in a family quarrel now and again.

As an example of what I mean as to cases—last year I had several open joints, after a long interval in which none had occurred. One subject was a four-year-old cart colt with injury to hock joint. He was unwilling to accept any assistance from slings, when weary of resting on the other leg; in fact, I came along one day just in time to save his life, so violent was he at the restraint of slings. The injured member recovered after some time. He was turned out. When he came up from grass, he had not only a dropped sole, but cocked his toe (of the sound limb) like an unnerved horse whose tendons have given way. Now I cannot remember in thirty years of practice advising a shoe for a horse with one dropped sole in a hind foot. No doubt there are plenty among your readers in large town practices who have had such cases. Will one of them kindly advise?

To the more advanced physiologists I would like to put a question about unnerved horses. I would first say that I have had a great many and seldom use any others. In only two instances do I remember the foot coming off shortly after, and with that dark green or black matter with which it is associated. A very few cases of, what I imagine to be, gelatinoid degeneration of the limb have followed, and such has been the case in every one where a blister has been applied. A good few, when operated upon too late, have broken down in the tendons and turned up their toes in more senses than one, but what I have been so long coming to and wish to ask is, the reason of the very great growth of the feet in almost all cases after neurotomy? One could easily understand that a horse whose frog had fallen in by that atrophic process which follows on too much use of the toe, and no bearing on the frog, should gain at the heels, when once again the feet take a fair bearing, and the old centre of gravity is restored by alteration of the columns, but I have found that the whole foot grows in length as well as heel, *at a rate that no ordinary sound horse's foot does.*

I have at the present time a pony which had been the subject of navicular for something like a year, but in such a mild form that I advised the then owner to give him six months on a wet marsh. He did so and the pony went sound for a few days, as is usual in such cases, and changed hands—to become rather lamer than before. He presently came into my hands, and it was a question in my mind whether the risk of neurectomy was not too great, in view of the fact that he had a very small and rather flat foot (navicular affects all sorts of feet), but I decided to operate. This was less than three months ago, and in that time the feet have grown so long as to make it necessary to have them shortened, although one always desires to have plenty of nailing room on an insensitive foot. Will anyone tell me in what way the nutrition is so greatly increased, altogether beyond that of the average sound foot I mean, and not simply the restoration of things to the *status quo ante* navicular lameness?

I have never been able to obtain a satisfactory explanation of the sloughing of a foot when not pricked or due to a direct injury. Does it, in rare instances (the operation I mean) deprive the foot of nutrition, and in the majority of cases add so greatly to it? According to my very limited knowledge of anatomy or physiology (I don't know exactly which it comes under) the plantar nerves are purely sensory, and should not therefore have any influence either way. From my own observations I lean to the opinion that a foot coming off is always due to death of the extremity, as the formation of pus from a prick, or wound or corn nearly always manifests itself in time for curative measures to be taken, and I find no difference in the response to treatment, save for the ease with which one can dig and burrow in an insensitive foot.

In one subject of my own, a festered corn broke

out at the heel, and I put a large seton through it, with a good dependent orifice, tied the tape round his pastern, and put him in harness. He worked on without any inconvenience; the wound progressed in the way one expects of an ordinary horse, and after a week I removed it. He went away on a job and was never troubled again.

Another question I should like to ask is, as to the manner of repair in those subjects which continue to work sound for many years? Does the joint or the navicular bone actually undergo repair? Is that ivory-like material one sees in the cancellated structure of the bone to be regarded as a lasting reparative process? Is it more likely to occur in an unnerved animal?

I can hardly think that an animal requiring the operation of neurectomy to render him of any service, would recover such structural changes as are associated with the malady in questfon, even though he enjoyed years of rest. The majority of readers will, I believe, bear out my observations, that when once thoroughly established there will follow atrophy of frog and heels and that shape of foot which is the result, and not cause of navicular, as we were taught in the long ago when our instructors approached with trembling hands the bloody work of neurectomy without chloroform or tourniquets, and antiseptic surgery for horses was a dream of the future.

HAROLD LEENEY, M.R.C.V.S.

ABSTRACTS FROM FOREIGN JOURNALS.

(*Continued from p. 303.*)

THE CASTRATION OF CATTLE.—II. Contribution by District Veterinary Surgeon FRIEDRICH, of Halle.

On the 29th of August a trial castration was made on a fat cow, which as well as the remaining four cattle operated on was not stinted of food but only prepared for the operation by a glycerine clyster given about 12 hours previous to operating. After the operation the cow showed little loss of appetite but stood with arched back and lowed frequently on the first day.

On the next day the animal appeared to be in a normal state, and on the 5th September (7 days later) was giving the usual quantity of milk. She was slaughtered. On examination the wound in the vagina was completely healed, there was a small coagulum of blood in the uterus, the peritoneum was perfectly intact. On account of this favourable course Friedrich castrated six further cows for the same owner on September 7th. Four of these cows frequently bellowed. On the 2nd day their appetite returned whilst the remaining two would eat nothing for some days but eventually recovered their appetite. In these two cows the vaginal wound was not healed in eight days, whilst in the other four the vaginal wound was completely healed at this period.

Four weeks after castration one cow gave the usual quantity of milk again, whilst the others gave short supply from formerly as follows: one gave 53 fluid ounces less, two gave 116 fluid ounces less, and two gave 141 fluid ounces less.

On September 18th, Friedrich castrated five more cattle, two of these were slaughtered on account of internal hæmorrhage. A third showed signs of acute peritonitis and had to be slaughtered. A fourth was also slaughtered as she showed unfavourable symptoms.

As Friedrich was exceptionally careful as to his aseptic and antiseptic precautions in these latter castrations he attributes this bad result to the strong mixture of food given after the operation.

The first cow that died received three pounds of ground maize, three pounds of palm nut meal, two pound of boiled earth nuts, two pounds of malt, six pounds of dried parings; the other animals had a mixture of 3½ to 4 pounds cotton cake, 1½ pounds rice meal, 2 pounds bran, 2 pounds malt, 1½ pounds of molasses, 25 pounds of sour turnips tops, and 50 pounds of sour turnip parings.

Another cause for the violent hæmorrhage may have been that the second lot of cows had calved about four weeks before castration, whilst the first lot had been miked for three or four months.

Veterinary Surgeon Hoffherr castrated some cattle six to eight years ago and used the ecraseur without losing any cattle.

G. M.

(*To be continued*).

REPORT ON THE METHODS OF INOCULATION AGAINST RINDERPEST.

By LEONARD ROGERS, M.D., B.S., ETC.
Officiating Imperial Bacteriologist in India.

For several years past, Dr. Lingard, the Imperial Bacteriologist to the Government of India, has been anxious to carry out an investigation on rinderpest, which probably carries off more of the cattle of this country than all the other infectious diseases put together, but, owing to a laboratory suitable for the purpose having to be built in the hills before he could begin work on the subject under favourable circumstances, it had not been found possible for him to carry out his intention before the outbreak of the disease in South Africa led to the discovery by Professor Koch of his bile method of inoculation. In June, 1897, Dr. Koch, who had visited India in connection with the work of the German Plague Commission, was asked by the Government of India to demonstrate his bile method at Muktesar laboratory, and having consented to do so, he visited Muktesar for the purpose, and several of the officers of the Civil Veterinary Department were ordered to attend the demonstration. Dr. Lingard, who had made the necessary arrangements and carried out the experiments with Professor Koch, submitted a report on them, in which he stated that owing to the virus having to be obtained during the hottest month of the year in the plains and taken up to Muktesar, it very soon lost its virulence on being passed through a series of animals, so that although it was fatal in one of the first two animals inoculated and caused a very severe attack of the disease in the other one, yet, in the second series, only slight attacks appeared in some of the animals, and on the third passage a very mild attack appeared in one, and no typical symptoms in the other. On account of this rapid attenuation of the virus and owing to Professor Koch inoculating some of the animals with rinderpest blood earlier than the tenth day after the injection of the bile, because he was unable to remain longer at the laboratory, with the result that some of them took the disease, the experiments were

considered by Dr. Lingard to be inconclusive. On two subsequent occasions Dr. Lingard obtained virulent blood from the plains, but each time the same attenuation of the virus after a few passages occurred, and it rapidly died out altogether, so that at the time of his unfortunate illness no further progress with the experiments had been made. It should also be mentioned that up to this time the cattle sheds, sterilizing house, snow well and cold room were not completed, so that it was impossible for Dr. Lingard to have commenced the experiments under favourable conditions before he was compelled to return to England on sick leave.

At the time of my arrival to take over charge of the laboratory in November, 1898, the buildings mentioned were very nearly finished, with the exception of the cold room, which was not ready until April 1899, so that at the beginning of 1899 it was found possible to commence the experimental work, the necessary virulent blood having been obtained from the plains by my assistant, Veterinary-Lieutenant G. K. Walker, in the first week in January of that year

The conditions of Rinderpest in India.

The conditions under which rinderpest is met with in the plains of India and those which prevailed during the recent outbreak in South Africa are about as different as could well be imagined. In the latter the disease spread with appalling rapidity, advancing at one time at the rate of 20 miles a day, and carrying off from 90 to 95 per cent. of the cattle of whole districts, and it is thought by good authorities that, but for the discoveries of Prof. Koch and others, 90 per cent. of the whole of the cattle of South Africa would have been carried off before the outbreak subsided. In India, on the other hand, the disease may best be described as being usually sporadic, although severe outbreaks may occur at times, as occurred in Chota Nagpur in the years 1861-63, when over 66,000 cattle and 68,000 buffaloes died of the disease, and in Assam in 1869-70 when over 60,000 animals were carried off. The disease is more virulent in the cold than in the hot weather, and in the latter season it often smoulders on, a few cases being met with here and there, but with very little tendency for it to spread, as I had ample opportunities of seeing during inoculation work in the North-West Provinces in the last hot season.

In this respect the disease in India much more nearly resembles that met with in the steppes of Russia than the outbreaks in England in 1865-66 and the recent one in Cape Colony.

The differences pointed out above are sufficient to show the importance of carefully testing the South African methods of inoculation before attempting to carry them out on a large scale in this country, while the fact, which will be pointed out later, that none of these methods have been found to be satisfactory in all the breeds of cattle in India without important modification, proves the wisdom of the Government in ordering this investigation. But there are other and still more important reasons for this step, namely, the prejudices of the people with regard to their cattle, which necessitated the utmost caution in attempting to introduce such a novelty as the inoculation of the most sacred animal of the Hindus. For example, it would be quite out of the question to even suggest such a thing as the slaughter of cattle after inoculation with rinderpest blood for the purpose of obtaining suitable biles for Koch's method of inoculation, while it is somewhat questionable if the people of many parts of the country would even allow of *post-mortem* being systematically made on all their animals in order to obtain biles for glycerinating, although they do not usually object to the body of one dead animal being examined to confirm the nature of the disease. Moreover, a good deal of tact is often required in order to obtain the virulent blood from a diseased animal, which is required in both the simultaneous and glycerine bile methods. For these and other reasons it was necessary for me to visit some outbreaks of the disease and to personally carry out inoculations in them, so that I should be able to report on the practical as well as the scientific aspects of the important question as to what method or methods are most suitable to the different circumstances attending outbreaks of rinderpest in India, and to treat in this report of certain practically important details which might otherwise have been considered outside the scope of a purely scientific research into the question of methods of inoculation.

This report may, then, be conveniently arranged as follows :

(1) Previous and concurrent work on the subject ; (2) experiments with Koch's bile method, in hill and plains animals, with a summary of the advantages and disadvantages of the method ; (3) similarly with Edington's glycerine bile method and a new method of inoculating with filtered bile on similar lines ; (4) Turner and Kolle's simultaneous method, and a new "reinoculation" modification of the same ; (5) experiments with mixtures of bile, serum and blood, etc. ; (6) inoculation of sheep and goats, and sundry other experiments on various points ; (7) the preparation of serum and inoculations in outbreaks of rinderpest in the hills and plains ; and (8) discussion of the relative merits of the different methods of inoculation against rinderpest in relationship to Indian conditions.

Before passing on to those sections it may be well to very briefly refer to the arrangements at Muktesar for prosecuting the experiments, on the efficiency of which so much of their value depends. The Muktesar laboratory was built and equipped especially for research work on rinderpest, by the Government of India in accordance with a scheme which was initiated some time before the outbreak of rinderpest in South Africa, and not as a result of the work done there, but because of the knowledge that probably upwards of 100,000 animals die yearly of the disease in India, but, as already mentioned, owing to diverse unavoidable delays the work could only recently be taken up, although the Government is none the less deserving of credit for its enlightened policy on this account. In addition to the laboratory proper, five cattle sheds have been constructed, with a line of rails running through two of them and down to the post-mortem house and incinerator, so that adequate arrangements can be made for the isolation of all infected cases of the disease in the last mentioned two sheds, and the other three can be kept free from infection by moving out all cases immediately the temperature rises, and before any infectious discharges have escaped from them. By means of this precaution, the employment of separate cattle attendants for each shed, and the use of phenol to disinfect the feet of every one entering them, it has been found possible to keep two sheds, which were only about one hundred yards from two others which contained rinderpest cases, quite free from infection during the twelve months over which the experiments have extended—a success for which I am mainly indebted to the unceasing vigilance of my assistant, Veterinary-Lieut. G. K. Walker. Ice, which was necessasy for the making of serum during the hot weather, was obtained from the snow well, and all the other arrangements which had been carefully organised by Dr. Lingard, worked very satisfactorily. I am also indebted to him for an outline plan of work, although I was unfortunately deprived by the seriousness of his illness from advantage of being able to discuss the subject with him before commencing the work.

Previous and Concurrent Work on Rinderpest.

Modern research work on rinderpest may be said to date from the visit of Professor Koch to South Africa late in 1896, which resulted in his discovery of the bile method of inoculating against the disease, which was fol-

lowed by Edington's glycerine bile modification, and the work of various observers on serum inoculations, culminating in Turner and Kolle's simultaneous method. More recently these methods have been tested in other countries as well as in India, more particularly in Turkey and Russia. Not unnaturally, very different conclusions have been from time to time expressed with regard to the different methods by various workers, so that a brief examination of such evidence as has come to hand will be of use at this period, and will also be essential to the clear understanding of the experiments which have been carried out during the past year at Muktesar laboratory, and to the discussion in Section VIII. of this report of the question of the suitability of these methods, or modifications of them, to Indian conditions. It will be convenient to take them in the chronological order above mentioned, discussing any modifications of the principal methods under the head of that from which they are derived.

(1) Koch's Bile Method

This consists in the injection into the dewlap of 10 c.c. of a bile of from the sixth to the eighth day of the disease, which has been obtained by an animal being killed at that period of an attack of rinderpest, usually after being inoculated with the disease. From 3 to 7 per cent. of herds were sacrificed in this way in order to provide bile for inoculating the remainder, as not every animal yielded a suitable bile. Koch advised that only those biles which were clear, of a dark green colour, sweet smelling and giving a white froth on being shaken up, and which had been taken with a sterile trocar into a sterile vessel, should be used. Turner and Kolle say that any bile that does not smell foully or which is not red with blood may be safely used by Koch's method, and that if animals are inoculated with really virulent blood and killed at the end of the sixth day of the fever, four, out of five of them, furnish typically good biles. Theiler says that any sweet bile without sediment of either a green, yellow or brown colour may be used, but that light green biles afford the least protection. Edington says that brownish, yellowish or reddish biles almost invariably cause rinderpest in some of the animals inoculated, but are safe if kept for a few days. The older biles are said by him to give most infection.

Immunity results from the sixth to the tenth day, the former being the earliest date at which it appears and the latter the latest. Turner and Kolle admit that some biles give no protection, but this may be avoided by mixing several together before use. The duration of the immunity is now pretty generally admitted to average about four months, but may occasionally be only three weeks, one writer putting the limits at between four weeks and six months, and in any given herd which may all have been inoculated with the same biles, the immunity passes off at different periods, so that at less than four or five months after an inoculation with bile the whole herd cannot be passed through an attack of rinderpest by any other method, some of them failing to react, and not getting any increased immunity. In one herd which was attacked five months after the bile inoculation, 80 animals were lost, showing that the immunity had passed away within that time. If larger doses than 10 c.c. are used the immunity does not last longer, but by repeating the bile inoculation every three months protection can be kept up.

Results.

Very valuable results were obtained by this method, which saved several hundred thousand head of cattle in South Africa before other methods, by means of which more lasting immunity can be obtained, were worked out, but it has now been practically entirely replaced by the latter. For example, in Basutoland out of 100,000 animals no less than 70,000 were saved by this method, upwards of 90 per cent. of which would have perished if the disease had been allowed to run its course unchecked.

In Russia and Turkey the bile method has not found favour. Thus Nencki says bile did not give constant results, the inoculated animals sometimes contracted the disease in a fatal form, and it may have contributed in spreading the disease; at other times no immunity or only a fleeting immunity was produced by the bile. Nicole says bile gives immunity of short duration, but that it is not used in Turkey if serum is available. Krause says that the bile immunity may be increased by injections of 10 c.c. virulent blood 10 to 30 days after the bile, but this is very doubtful if no reaction occurs.

Can Bile Inoculations induce Rinderpest?

A warm controversy has raged around this vexed question, and as it is one of great practical importance it cannot be passed over in silence, although it is very difficult to come to any definite conclusion as a result of examining the opposing statements on the subject. Turner and Kolle deny that rinderpest bile of from the sixth to the eighth day of the disease will ever give rinderpest, and adduce the very strong argument that rinderpest blood can be mixed with the bile without causing the disease until the two are inoculated in equal quantities shortly after mixing. Thieler says that in 1,000 inoculations with bile in only two did rinderpest follow, and in these there might have been infection from other causes; on the other hand, both Edington and Veterinary Surgeon Edgar assert that it is the unanimous opinion of every veterinary officer who carried out bile inoculations throughout South Africa that in very many cases the disease is conferred by fresh rinderpest bile, and the former writes that his own experience admits of his saying "that bile can and does produce rinderpest, but certain samples do so more than others." The disease is said to have appeared on the eighth day after the bile inoculation, in some instances in as many as 20 per cent of the animals, while Veterinary Surgeon Sinclair reports that rinderpest appeared in 90 per cent. of the herds inoculated in his district, the disease appearing on the seventh or eighth day after the bile injection. Henning says that bile gives the disease if taken on the eighth day, but if it is kept for from one to three days, there is less chance of infection. Nencki says that yellow and blood-red biles nearly always give the disease, while other biles give an immunity which often only lasts from two to four weeks, for which reason this method has been given up in Russia.

The positive opinions with regard to rinderpest being produced by the bile inoculations are, then, of too great weight to be lightly dismissed, but how can they be reconciled with the fact that virulent blood can be mixed with bile from a healthy animal without producing either disease or immunity? In the first place the interesting experiments of Kolle have shown that rinderpest bile does contain the virus of the disease, for he succeeded in producing rinderpest by inoculating the sediment of a bile from which all the colouring matter had been removed by frequent washings in a centrifuge, while he further states that a bile of the third or fourth day may produce rinderpest. It is evident, then, that the virus exists in rinderpest bile, but it is modified in some way in biles of over the sixth day by some kind of immunising substance which is also present in these late biles. Now Turner and Kolle also admit that some biles even of the later dates may have no protective power, that is, they contain no more of the protective substances than do the early biles, which Kolle says produce rinderpest. It may well be, then, that such a bile may exceptionally produce the disease, and so from its rarity account for the contradictory statements.

However this may be, it appears to be generally admitted that if a bile is kept for two or three days, it will

never cause the disease, while the mixing of several biles together before use would also probably reduce the danger to a negligible quantity. Although, then, the experience at Muktesar during the past year has afforded no evidence that rinderpest was ever produced in cattle under unequivocal circumstances in any of the few inoculations which were carried out with it, yet the positive evidence from South Africa and Russia that it may sometimes do so, seems to be of sufficient weight to render it advisable to take the simple precautions to avoid the possible dangers which have just been mentioned, especially as the one advantage of this method, which may, under certain circumstances, still make it preferable to any others, is that it need not introduce the disease into an uninfected herd, as is the case with the glycerine bile followed by blood inoculation or the serum simultaneous method, and it is for this reason that the point in question of infection from bile is of such importance.

(2) Glycerine Bile Method by Edington.

It was as a result of the very widespread belief in South Africa that ordinary bile often introduced rinderpest into clean herds, that Dr. Edington devised this method. Koch having previously shown that glycerine destroyed the virulence of rinderpest blood, Edington added it to bile in order to prevent it causing the disease and found that although its immunising properties were much lessened by this process and keeping it for eight days, as he advised should be done, yet ten days after the injection of 15 c.c. of a mixture of two parts of rinderpest bile to one of glycerine, sufficient protection was caused to allow of an injection of 0·1 c.c. of virulent blood, and that after a further interval 1 c.c. could be safely administered and a strong immunity thus built up. By the injection of such a small dose of virulent blood ten days after 15 to 20 c.c. of the glycerinated bile, according to the size of the animal, a mild attack of the disease with resulting long immunity was frequently induced, and many herds were thus protected. However, heavy loss is said to have sometimes ensued on account of no reaction often having followed the dose of blood, owing to the variable degree of immunity resulting from the glycerine bile, thus leaving the animals susceptible to the disease at a later period, for the injection of the rinderpest blood does not strengthen the immunity unless a temperature reaction ensues; still on the whole very good results have been reported to have been obtained by this method. Thus 393,777 animals were inoculated with a loss of only 8·24 per cent. in 23 districts in which this method was extensively used. The results obtainable by this method are well summed up in the following quotation :—"In a herd of cattle of which the losses amount to 5 to 10 per cent. and many show signs of the disease as catarrh from the eyes, cough, and fever, I think it may safely be said that the whole are well protected, because others of the herd, although not appearing to be sick, will, on taking their temperatures, show a febrile reaction. On the other hand, if none show sickness, it proves that the immunity conferred by the bile was strong at the period of the second or blood inoculation, and that few of the herd have given a febrile reaction. The cattle in this case will be open to infection in a very short time. This accounts for the sometimes heavy losses following a second administration of virulent blood." Edington writes that "the immunity thus produced lasts for several months, but if after the first inoculation with virulent blood, a second or even third is made with increasing doses, the immunity is greatly increased and the period of its duration is very greatly extended," and he gives an example in which it was perfect at 15 months after the inoculation. Hutcheon gives an example of 709 animals, which had been inoculated with glycerine bile four months before, and on inoculating them with 2 to 4 c.c. virulent blood, followed after 24 to 48 hours by from 30 up to 100 c.c. of strong serum, nearly all of them were sick, but only four died. In this case the immunity after the glycerine bile had ceased at the end of four months. Edington also claims that by his method more biles can be used than by Koch's method, as he uses all biles which are not putrid, red or thin yellow, but according to Turner and Kolle all biles which do not smell or are blood-red can be used by Koch's method, so that there is little to choose between the two processes from this point of view.

Edington also advises the use of glycerine bile alone on the appearance of a disease in a herd, and he gives an example of 400 animals being protected although exposed to infection by injections of this mixture at intervals of one and two months. Further, 20 to 30 c.c. doses are said to give immunity for about four months, and as it keeps for a year or more farmers can preserve it ready for use on the disease breaking out in their herds.

It appears, then, that by the use of repeated injections of the glycerinated bile alone, protection can be maintained, while if it is followed by a very small dose of blood this can be extended up to three or four months, and by a slightly larger blood injection a herd may be passed through a mild attack of the disease with a loss of from 5 to 10 per cent., but with long immunity.

(3) *Serum or Defibrinated Blood alone as a Preventive Measure.*

Injections of serum have been used by various workers to protect animals against rinderpest, but as the immunity so produced is of a passive nature it is necessarily of short duration, and considerable doses must be used if it is to be of practical use. Nevertheless it is of service under certain conditions, as, for instance, where it is desired to protect animals, which are advanced in pregnancy or are being milked, from a passing danger of infection, so that the results obtained by different observers may usefully be referred to here.

It was shown by Koch that 100 c.c. of defibrinated blood, taken from an animal which had recently recovered from rinderpest, would protect another animal temporarily from infection, and this has been confirmed by various observers, more especially by Danysz and Bordet in the Transvaal, and Pitchford and Thieler in Natal, and Spreull in Cape Colony, although these latter workers went a step further and tried to induce natural infection by means of exposure in an infected herd or smearing discharges from cases of rinderpest on the noses of protected animals, in order to produce a mild attack of the disease with resulting lengthy immunity of an active nature. A large number of animals were "salted" in this manner, but sometimes the loss in a herd amounted to 22 or 24 per cent, so this method has given way to the more scientific and safer simultaneous method of Turner and Kolle to be described presently.

Serum alone in 20 c.c. doses only protected for 10 days, while doses of 100 c.c. of a strong serum is said to afford immunity for from two to four months, while Nencki in Russia says that from 50 to 100 c.c. of fortified serum, in accordance with the size of the animal, will protect for from four to six months. Serum was also used in South Africa in infected herds, the inoculated animals being allowed to mix with the diseased ones in the hope that they would take the disease mildly, and Hutcheon states that in several herds thus treated the disease was stopped temporarily, but as many did not take the disease, and were not salted, when rinderpest appeared again a large number became badly affected with a heavy mortality.

It is, however, from Russia that the most favourable reports of the use of serum alone as a protective agent in actual outbreaks has recently come, and as the conditions

in that country much more nearly resemble those that pertain to India than did those of South Africa, they are of peculiar interest. Thus Nicolle and Adil-Bey report that 25 c.c. of a serum, obtained from a salted animal, which has been fortified by a single injection of four litres of virulent blood at once, will protect against an injection of virulent blood a few days later and against natural infection, and such injections in healthy animals have been used by Refik-Bey in several outbreaks of rinderpest in Turkey with a mortality varying from *nil* to 0·14 per cent., and among those in the incubation period from 0 to 1·7 per cent., although the mortality in the herds had previously been from 44·4 to 81·5 per cent. The immunity thus produced passes off in a few months, but appears to have lasted long enough to have protected the affected herds through the particular outbreak of the disease to which they were exposed, and, although the serum simultaneous method also gave good results in the hands of these observers, they appear to prefer the injections of serum alone, as they find it gives sufficient protection for practical purposes under the conditions they were working in. In some cases the serum inoculation was repeated after a few months.

It should be mentioned that serum and defibrinated blood exert the same influence, but 20 c.c. of the former are equal to 30 of the latter, while in addition to the impossibility of keeping the blood for long, it is said to lose its power very soon, while serum to which ½ per cent. carbolic acid has been added, is stated to preserve its immunising power undiminished for upwards of nine months.

Serum as a Curative Agent.

Very different opinions have also been expressed with regard to the curative value of serum, although extended experience has now allowed of a fairly definite consensus of opinion to be arrived at with regard to its power in the South African breeds at any rate. Turner and Kolle said that 20 c.c. of their serum would cure cases in the early stages, and that 50 to 100 c.c. would save animals in the later phases if they were not collapsed, but Hutcheon found that very much larger doses were necessary, and even then they were only of service in the earliest stages of fever before the appearance of symptoms, and he got the best results in the case of calves, which were given relatively very large doses. Even in repeated large doses good results were not obtained, and if the first dose does not have a markedly good effect it is no use persevering with it. Instances are recorded in which although the temperature was taken daily, and from 100 to 120 c.c. were given as soon as it rose, very few animals recovered after a severe attack of the disease. The serum, then, appears to be of very little use when once the usual symptoms of the disease have appeared, but if it can be used as soon as the temperature rises in doses of 100 c.c. and upwards it may save some of the animals, but such large doses are not always available.

(4) *The Serum Simultaneous Method of Turner and Kolle.*

The uneven results obtained by exposing animals to natural infection after inoculating them with small doses of serum led those observers to introduce their method of inoculating a small dose of virulent blood on one side of the animal at the same time that the dose of serum, which had been found to produce the required effect, was injected on the other side. By this means it was claimed that 90 per cent. of the animals had a more or less severe attack of the disease with a loss of but 1½ per cent., whilst those which did not react were still immune for several months. This method was very widely adopted in South Africa, and more recently in other countries, with very favourable results, over 100,000 head having been inoculated in Rhodesia alone with a loss of less than one per cent., and the permanent protection of over 90 per cent. of them, the disease having by this means been stamped out of this large tract of country. The serum is prepared by inoculating salted animals with increasing doses of virulent blood until 1,000 c.c. has been given at once, and after bleeding once a week for three weeks, inoculating again with still larger doses, and bleeding again.

When a certain quantity of serum has been obtained it must be tested on a series of animals, doses of from 10 up to 30 c.c. or more per 600 lbs. weight being used, and the dose which gives a safe reaction in all the animals is that fixed on. The weights can be estimated by a simple system of measurement with sufficient accuracy for all practical purposes. If an animal reacts too severely he should be given a large dose of serum as soon as his temperature rises.

The reactions obtained by this method are said to vary considerably. Turner and Kolle say that the object is to insure an infection as definite and severe as possible and at the same time to administer such a dose of serum as to ensure the safety of the animal, a modified form of the disease with all the usual symptoms being produced. Hutcheon says that the reaction was very irregular in some herds inoculated by him, some severe, some slight, and others *nil*, and other workers report similar results. Edington says that in those cases which get no fever the protection afforded is slight. In herds in which the disease has recently been introduced very good results have been obtained, the herds being free from the disease in three weeks with very slight loss. Nicolle agrees that if no reaction is obtained the immunity is transitory, and says that the steppe cattle do not usually react after 25 c.c. of his serum, but possibly this dose was too large. The more susceptible breeds of animals often had a temperature reaction with the same dose, showing that the different breeds required different doses of the same serum in order to produce reactions in them, which is of interest in connection with the similar differences between the hill and plains animals of India, which is pointed out in Section IV.

(5). *Serum after Blood.*

In consequence of the number of cases in which only a very slight or no reaction was obtained after the serum simultaneous method, Hutcheon advised that the blood should be given 48 hours before the serum, and as soon as the temperature rose, a large dose of serum should be injected. By this modification a larger percentage of animals were passed through a severe attack of the disease, but at the cost of a greater loss of animals than with the simultaneous method, while the disadvantage of having to tie up and inoculate all the animals twice over, and then to take their temperatures and to inject a further dose of serum as soon as it rose, complicated the method very considerably. A much simpler and safer method of obtaining reactions in all susceptible animals without loss will be found described in Section IV of this report.

The question of the danger of rinderpest being spread by the use of the simultaneous method of inoculation is an important one. When infected herds are inoculated, the disease will be cut short and last a much shorter time than if it is continued by the slower process of natural infection, but will not the inoculation of clean herds be liable to spread the infection to neighbouring ones? The evidence which has accumulated in Cape Colony on this point appears to show that the danger of such a thing happening is very much less than might have been expected. Thus both Hutcheon and others report that they have never known the disease to be thus spread, while on the contrary this method has frequently resulted in the affection being rapidly stamped out of a district, Hutcheon writes with regard to this point that "although all the cattle are given the disease in a more or

less modified form by the proper application of the serum treatment, it is a curious fact that infection is rarely carried from such a herd if ordinary quarantine precautions are taken. . . . Serum inoculation has not been general or systematic, but individual herds have been inoculated all over the place, yet the disease has not been spread by that means; on the contrary, by the aid of the serum method of inoculation the disease has practically died out of the Cape and Tulbagh districts."

(*To be continued*).

SOME LINKS BETWEEN NATURAL HISTORY AND MEDICINE.

By J. Arthur Thomson, M.A., F.R.S.E.,

Professor of Natural History in the University of Aberdeen.

Address to the North British Branch of the Pharmaceutical Society, delivered on Friday, November 23rd, 1900.

Let me thank you, first of all, for your kindness in giving me this opportunity of addressing you, which I can assure you I regard as a pleasure and a honour. As my work does not lie exactly alongside of yours, I thought we might find a convenient line of contact by considering for a little some of the links between natural history and medicine. But as the day has already doubtless been long to some of you, as to me, we may perhaps consult our mutual convenience by trying to observe the virtue of brevity, and be content with illustrations of a subject which obviously affords material for prolonged discourse. The links between natural history and medicine which I wish to-night to illustrate are many and varied. Some were forged centuries ago, and some of these have since snapped; others are strictly modern; others, such as the *rôle* of mosquitos in spreading malaria, are at this moment in process of being formed and tested.

The Leech.

One cannot think of links between natural history and medicine without recalling, first of all, that a familiar animal—the leech—was used for so long (since before the Christian era) and so much (for all manner of ailments), that its name, which is said to mean "heal," became that of the medical practitioner himself. For people used to say "Send for the leech" when we should say, "Send for the doctor," and leeching was synonymous with medical treatment. Yet, as everyone knows, a reaction set in; the leech—the animal, I mean—and bloodletting went out of vogue; leech-ponds disappeared; and I suppose the trade in leeches is now relatively trivial. There is a record of a Breton peasant, in 1883, who had received from the surgeon half-a-dozen leeches to apply to some congested or inflamed part. Being ignorant of the method of application, he handed over the problem to his wife, who in this case was wrong, for, on a neighbours's advice, she fried the leeches and gave them to the poor man. In spite of their bitter taste, he managed to get outside of them all, and died thereafter.

It is evident that the gentle art of using the leech is decadent. In *The British Medical Journal* for March 18th, 1898 (I quote on the authority of Dr. Fernie), it is stated that "leeches," on which the older physicians placed such reliance, seem to be coming again into fashion. But we have known the ordering of a few leeches in a leading London hospital, not so many years ago, cause consternation among the dressers; a consultation had to be held as to which was the "business end" of the leech, and the combined intelligence of the staff was brought to bear on the problem "how to make him bite."

In former days, not very remote, a thoroughly qualified medical man was expected to have a knowledge of natural history, developed along a line which is now but rarely followed. He was expected to know a large number of forms, not because of their scientific interest, but because of their supposed practical value. In other words, he had to know the "animal simples," the uses of animals as medicines, uses which sometimes suggest gross supersition, but sometimes extraordinary insight. If we consult a compendium of animal simples, such as one by Dr. Fernie, we get two opposite impressions. We are amazed, on the one hand, at the credulity which is implied both in those who prescribed and in those who swallowed many of the reputed medicines. We wonder, on the other hand, at the justification which modern science has given to some of the old prescriptions.

It seems to me that we may divide the old prescriptions into three sets—those with no justification, perhaps 75 per cent.; those with an obvious justification, perhaps 20 per cent.; and those which have found some justification—by no means obvious—as the result of recent scientific progress, these forming the remaining 5 per cent.

Old Prescriptions.

The first set of old prescriptions, which I select from Fernie's 'Animal Simples,' includes those which have no real justification:—Rheumatic patients were told to take a black cat to bed with them, for it is rich in curative electricity; the dust of a dried magpie was used in Germany as recently as 1880 as a cure for epilepsy; the skink lizard once held a place in British pharmacopœias as a cure for leprosy and much else; to stop hæmorrhage the patient was recommended to lay hold of a dead toad, "horror and fright constraining the blood to run into its proper place for fear of a beast so contrary to humane nature;" to lay an open pickled herring on the soles of the feet on going to bed was deemed a cure for swollen legs—to thrifty Scots it would seem sheer wastefulness; we would prefer an internal application. These are a few of the least extravagant of the many old prescriptions which may, I suppose, be dismissed as without any justification.

The second class of ancient prescriptions includes those which may have something in them, for the obvious reason that the animals used contain certain potent or at least useful chemical substances. It is not surprising that decoctions of ants should have been found to have at least some effect, for ants contain formic-acid; it is not surprising that powdered pearls—a dose for the wealthy—might be of some service, since pearls are made of lime; it is not surprising that the snail in its chemical complexity might have dietetic value. Has it not been called "the poor man's oyster?"

Toads and Snakes.

Now, we cannot have much interest either in the grotesque prescriptions or in those whose justification is obvious, but there is a third set whose character affords food for reflection. I refer to those in which there lurks an undeniable kernel of truth—reached we can hardly tell how—which has been justified scientifically by modern researches. It has been shown that what seemed absurd (or worse) had sometimes a real justification. Two examples must suffice. Preparations of the toad were prescribed for such maladies as dropsy, and we now know that phrynin, the active principle in the toad's skin secretions, has a powerful influence on the pulsations of the heart; is very like digitalin from the foxglove, and thus might really have a good effect in cases of dropsy from heart affections. As Dr. Hewlett points out in *Science Progress*, dried toads and toad ash, and toads in other forms, have been used medicinally since the time of Aristotle, and were recognised in materia medica till the end of the eighteenth century. Now, since the alka-

loid phrynin, found in the skin-glands of the toad (and also to a slight extent in the frog) causes, when injected, contraction of the arterioles, rise of blood pressure, increased cardiac contraction, and so on, it is at least conceivable that it might be of some real service in ancient days.

I take a second illustration from the treatment of snake-bite. The venom in this case is well-known to be of proteid nature, not alkaloid like that of toads and salamanders. It is the secretion of a specialised salivary gland. (*a*) The natives of several countries have been in the habit of drinking diluted snake poison to render themselves immune; this is certainly approached by the modern recommendation—*e.g.*, Professor Fraser, of Edinburgh, and Dr. Calmette, of Paris, that an antitoxin serum, prepared from snake venom, should be injected into the person bitten. (*b*) In many African snake medicines the bile of the snake is an important constituent; this is certainly approached by the recent evidence furnished by Fraser and Phisalix, that the bile of a venomous snake is an antidote, or even more than that, a preventative against the fatal effects of a bite. (*c*) An old Indian remedy for the bite of a certain snake is to chew the root of a labiate plant—*Pagostemon pur paricaulis*, this is certainly approached by the discovery of Phisalix, that the juice of the dahlia tubers, or of the fungus *Russula*, have immunising properties against the viper's venom. Let us note the line of discovery, doses of bile neutralise venom (Fraser); biliary salts and cholesterin have, like the intact bile, a neutralising or immunising effect (Phisalix); vegetable cholesterin will work like animal cholesterin, and even tyrosin from the dahlia has the same important effect (Phisalix). Thus we come back to herbalist medicine again.

The Lion's Heart and newer links.

Similarly let me remind you in a few words of an old-fashioned kind of remedy which, until recently, provoked only a smile from modern physicians. I refer to the prescriptions that the coward should devour the raw heart of the lion, that the weakly should eat the heart of an ox, that the lethargic should dine on a ram's brains, that the jaundiced should try the liver of a fox, and so on at great length. Yet surely there is some approach to this in the modern treatment of those unfortunate subjects whose thyroid glands have in some way gone out of gear, with the result that goitre or myxœdema ensues, for they are ordered to eat the thyroids of sheep or calf, or are treated with doses of thyroid extract. The results are apparently very effective; and the historical inference seems to me to be plain—that the old physicians were not such fools as they sometimes seemed.

But let me now give a few illustrations of what I would call newer links. The importance of having other organisms besides man to work with is at once a trite and difficult question, but let me recall a recent instance which can offend no one. It is said that the importance of the thyroid is somehow bound up with the iodine compound (thyreo-globulin), which it contains. But has not the matter been complicated by Professor A. Gautier's paper of last year, in which he demonstrated in the normal thyroids of dog, pig, sheep, and other mammals, besides man, the presence of minute quantities of arsenic. Though there are insensible quantities in the skin, arsenic is absent from the organs of the body, except thyroid, thymus, and brain. In the thyroid it exists in combination with nucleins, along with the usual phosphoric nucleins. Does not this shed some light on the alleged advantage of arsenical medicines in treating diseases of the thyroid, and will it not lead us to translate "no health apart from the thyroid" into "no health without arsenic?"

Parasites as Links.

But let me now pass to illustrate another kind of link—namely, in connection with parasites. Here natural history and medicine have over and over again joined hands, and it does not seem too much to say that, without the labours of zoologists in working out life-histories and inter-relations, the medical treatment of parasites would have remained very empirical. The two illustrations which I take both concern mosquitos. As long ago as 1878 Dr. Patrick Manson called attention to the part played by mosquitos in spreading a minute thread-worm parasite, well known as *Filaria sanguinis hominis*. His work has been confirmed by several workers, especially by Bancroft. Though the story has not been quite completed, it is almost certain that it will end as Manson and Bancroft predict. The story is this: The mature parasites live in the lymphatic vessels in man, and are by no means very small, measuring from 3in. to 4in. in length. They give rise to minute embryo filariæ, which live in the blood-vessels, swimming about when the host is sleeping, resting when he is active, perhaps because of the difference in the calibre of the capillaries during waking and sleeping hours. They cause very serious disease, which I need not try to discuss. Now when a mosquito bites an infected subject during the night it takes away with the drop of blood some embryo filariæ. From the mosquito's stomach these embryos bore to its muscles, especially in the thorax, and grow with great rapidity for seventeen days. It used to be stated that the mosquitos only fed once, and died within a week, but Bancroft points out that this was because the learned doctors omitted to feed the insects. By giving the introduced house mosquitos of Australia a little banana to suck, Bancroft kept them alive for weeks—indeed, for a couple of months. It is believed, though it has not been proved, that no further change will occur in the young filaria within the mosquito unless it pass somehow into man, there to develop into the full-grown worm of 3in. or 4in. Bancroft has suggested that a life-sentenced prisoner might be of some use to the world if he could be induced to swallow some mosquitos bearing filariæ, on condition of receiving a free pardon. It is difficult to believe that a prisoner would, in the circumstances, strain at a gnat. But how does the filaria normally get into man? It used to be supposed that the exhausted mosquito fell into water-tanks, that the filariæ emerged, and passed into man when he drank the infected water. But there is no evidence that the filariæ ever liberate themselves in this way from their mosquito host, and Bancroft has shown that the young filariæ put into water die in three or four hours. Therefore, water cannot be the vehicle of infection. It is now supposed either that man must swallow an infected mosquito or that he may put his fingers to his mouth after killing one; or that, when an infected mosquito is biting man, the filariæ, excited by the entrance of the warm blood, may burst into the mosquito's gullet and pass down its proboscis into man. This part of the story remains obscure.

Mosquitos and Malaria.

That mosquitos play a part in infecting man with malaria is an old and widespread belief, to which recent experimental work has given a scientific basis. An elaborate argument in favour of the popular belief was published by King in 1883, and since that date many workers have made contributions towards a solution of the problem—Manson and Ross in Britain, Laveran and Calmette in France, Koch and Pfeiffer in Germany, Bignani, Mendini, and Grassi in Italy. The question of priority is as difficult as it is tiresome. The general arguments in favour of the hypothesis, well summed up by Nuttall, are very suggestive:—The malarial season usually corresponds with a period of warmth and moisture—conditions which favour the development of mosquitoes; malarial regions are mosquito regions; devices which protect against mosquitoes—curtains, cities, drainage, and so on—also protect against malaria; these are

three of the many general arguments. But, suggestive as these arguments are, they do not prove the correctness of the mosquito-malaria hypothesis. Experimental evidence was necessary, and it has been forthcoming. Following a suggestion of Manson's Ross exposed malarial subjects in India to mosquitos, and observed that cresent-shaped parasites (*Proteosoma*) passed with the drops of blood from man to mosquito, and underwent a further development in the insect host. He also showed that only some of the many different kinds of mosquitos were suitable intermediate hosts for the malaria-parasite. Furthermore, he succeeded in producing malarial infection in birds—*e.g.*, sparrows and crows—by means of infected mosquitos. He was led to the conclusion, since confirmed by others, that malarial infection results from the bites of mosquitos whose salivary glands contain the parasite. I need not try to follow the numerous researches of other workers, but it is important to notice that Grassi and Bignani succeeded in infecting a patient with malaria as the result of the bites of a mosquito (*Anopheles claviger*), and in tracing the development of the parasites in those same mosquitos after they had bitten a malarial patient. We have here a good instance of the confirmation of general arguments by experimental evidence.

The Value of a Control Experiment.

But let us now notice the value of a control experiment. If malaria is due to the introduction of a parasite from the mosquito to the human blood, then there should be no danger in a malarial district provided that the mosquito's bite can be avoided. This idea led to the erection of a mosquito proof hut near Ostia, in one of the worst parts of the Roman Campagna, to serve as a cage for two volunteers who agreed to submit themselves to the test. Dr. L. Sambon and Dr. G. Low, of the London School of Tropical Medicine, arranged to live from May to the end of October in this hut, situated in a region "where scarcely a person spends a night without contracting malarial fever of a virulent type." No quinine or other drug was to be taken; the volunteers were to live in the mosquito-proof hut from an hour before sunset to an hour after sunrise, for the mosquitoes feed only during the night. The experiment seems to have been quite successful. On September 13 Professor Grassi and other investigators visited the hut, and sent this telegram to Manson:—"Assembled in British mosquito-proof hut, having verified the perfect health of the experimenters amongst malarial-stricken inhabitants, I salute Manson, who first formulated mosquito-malarial theory.—Grassi." Similarly, Dr. Elliott reports that the members of the Liverpool expedition, sent this year to Nigeria, have been perfectly well after four months in some of the most malarious regions, and that they attribute their immunity to the careful use of mosquito nets.

As my chief interest at present is not with malaria, but to illustrate the scientific method, I ask your attention to another experiment. The story of the two volunteers on the Campagna is a fine illustration of scientific enthusiasm, and of confidence in scientific methods and results. What they have shown is that by avoiding mosquitoes, or by getting mosquitoes to avoid you, malaria is escaped. But it may be argued that this is only negative evidence. The question is whether malaria can be produced in a healthy person by the bites of infected mosquitoes. In a recent number of *The British Medical Journal* it is stated that a consignment of mosquitoes which had been fed on the blood of a malarial patient in Rome was received in London in July, and that a son of Dr. Manson, who had never been in a malarious country since he was a child, allowed himself to be bitten, and thereafter suffered from well-marked malarial infection of double tertian type. Microscopic examination of his blood showed the presence of numerous malarial parasites. This must be regarded as an almost final proof of the hypothesis—shall we not say fact?—that malaria is transmitted by mosquito bites.

It is plain that in the solving of the practical problem of malaria the medical investigator has need of all the assistance that natural history can give him—*e.g.*, as to the many different kinds of mosquitoes and their habits, or as to the life-history of the sporozoon parasite, which is the real cause of the disease. A knowledge of the breathing habits of the larvæ (familiar to us in common gnats) explains the success of a petroleum film as a means of killing them off in marshes; a knowledge of the appetite which various fresh-water fishes have for them suggests another method of destroying them in ponds; and so on. On the other hand, since there is always action and reaction between a science and its corresponding art, it must be frankly allowed that it is the practical importance of malaria which has led the British Museum entomologists to hurry on at present with a monograph on mosquitoes.

Phagocytes and Protoplasm.

Let me illustrate another perhaps less obvious link. In almost all animals, from sponges to mammals, there are, within or apart from blood fluid, wandering amœboid cells, technically called phagocytes. As you know, they perform many functions both in health and disease. They form a bodyguard, struggling with invading bacteria; they surround and engulf irritant particles; they help to repair wounds, to regenerate lost parts, and so on. Phagocytosis has become to the pathologist a word of comfort, and perhaps there has been even some exaggeration of its importance. What I wish to point out is simply that much of the working out of the theory of phagocytosis has been in the hands of zoologists, as Metschnikoff shows clearly in his "Lectures on the Comparative Pathology of Inflammation." The beginning of it was in 1862, when Hæckel observed that grains of indigo injected into the mollusc *Thetys* were surrounded and engulfed by amœboid cells.

Or, again, you are, I believe professionally interested in the influence of chemical reagents on the complex substances which we sum up in the term protoplasm. But what is obviously one of the perennial problems of biology. Let me recall one of the sensational researches of the last eighteen months, as the result of which Prof. Loeb announces that if eggs of sea-urchins are transferred for a couple of hours to sea water to which magnesium chloride has been added (disturbing the normal proportion of salts), and are then replaced in their natural medium, they develop without fertilisation, and even form larvæ. It is too soon to say much about it; but here, obviously, if it is only to find out the fallacy, is one of the many problems where biological and medical or pharmaceutical students may profitably join hands.

A Victim to Over-Exertion.

Finally, another illustration, which may seem at first sight almost further afield than the last. There are few subjects in medicine more important than nerve fatigue and nerve rest. Let me remind you of what I may call a natural history contribution to neurology. Is it not the case that almost from infancy many of us—especially those of us who are fond of laziness—have been urged to consider the little busy bee which improves each shining hour. A more intimate and critical knowledge of bees and their behaviour entirely shakes our confidence in this exemplar of our childhood. I wish to lift only one corner of the seamy side by asking how the shining hour improves the busy bee. Whenever we ask this question we are struck by the fact that the worker

hive-bee has but a short life—often only for a few weeks after its industry begins. It is a victim to over-exertion. With all its getting, it gets not wisdom, but foolishness, for its brain cells go steadily and surely out of gear. Hodge compared the brain of bees issuing from the hive in the morning—when they were presumably fairly fresh—with the brain of bees who came last into the hive in the evening—presumably tired out—and demonstrated what, fifty years ago, would have excited great wonder—the structural effects of nerve fatigue.

The same striking contrast is seen when the brain of a young bee, fresh from the comb, is contrasted with that of a relatively old bee. A large number of cells have passed into what may be called a state of irrecoverable fatigue—collapse. As Professor Hodge says :—"The nerve cells, in the course of the bee's daily work, gradually cease to be functional, and die off, until no more are left than are sufficient for the necessary vital functions." His work suggests that there are three grades of nervous fatigue in animals ; (*a*) that from which recuperation is usual, what one might call the normal daily fatigue ; (*b*) that from which recuperation is possible, but difficult, what one might call extra wear and tear ; and (*c*) that from which there is no recovery, the final functional collapse of nerve-cells as in the bee's brain, and in some forms of old age. The state of the nerve-cells in the brains of some hibernating animals is also very interesting in this connection. I am not competent to follow the matter further, *e.g.*, in application to man, but I think the suggestiveness of a contribution like this must be plain to all. At any rate, I recommend a reconsideration of the little busy bee, but in a scientific rather than in a poetical light. The story of the bee's brain is a warning against over-industry, and one of the sections in the apology for rest.

Conclusion.

I have then illustrated some of the ways in which natural history has been linked to medicine, and some of the links that remain to the great advantage of both. But my illustrations do not cover a tithe of the real and possible kinds of links, nor have they suggested at all that the deepest service of natural history is probably in helping to lay the biological foundation stones on which the stately edifice of medicine, both curative and preventive, is reared.

I have mentioned a variety of animals—the leech, the toad, the snake, the mosquito, the bee, the sea-urchin, and so on—but the possibility of illustration is endless. Perhaps in the study of *every* animal one may find some suggestions of service in the study of man. As I was thinking of this, a Japanese waltzing mouse came dancing into the focus of my consciousness. But it is as good an illustration as any other, though it may not at first sight seem promising. The mouse moves only sideways, neither backwards nor forwards, and surely it becomes at once interesting medically in connection with defective equilibration and the like in man, when we note Von Cyon's discovery that it has only one of the usual three semicircular canals developed.

Even in my few illustrations I have probably made mistakes by touching subjects which are beyond my field of work, but to pounce upon these is to ignore the whole aim of my address, which is to suggest that the various departments of science—yours and mine, and that of others—are all correlated. It is not solely by the aloofness of specialism, and the pre-occupation of expert research, but by mutual interest and active co-operation as well, that we make progress in understanding the one problem which, in some form or other, is before us all—the Order of Nature. And it is this valuable width of scientific interest and sympathy which an actively functional Society like this is well suited to foster.—*Pharmaceutical Journal.*

THE NATIONAL VETERINARY BENEVOLENT AND MUTUAL DEFENCE SOCIETY.

The annual meeting was held at the Grand Hotel, Aytoun Street, Manchester, on Thursday, December 6th, 1900. George Morgan, Esq., President, in the chair. Present: Messrs. E. Faulkner, A. W. Mason, R. S. Reynolds, W. A. Taylor, J. B. Wolstenholme, J. H. Carter, T. Hopkin, J. E. Scriven, W. Woods, J. Abson, R. C. Edwards, J. McKinna, and the Secretary.

Minutes of the last annual meeting were taken as read and confirmed, the same having been printed.

Letters of apology for non-attendance were received from Messrs. F. S. G, Hobday, W. J. Mulvey, J. S. Carter, F. Somers, A. L. Butters. E. Kitchen, W. Carless, R. C. Trigger, and A. J. MacCallum.

President's Address.

Gentlemen,—It is customary in most well-regulated businesses to take stock once a year, to ascertain, if possible, how things stand—to learn lessons from the past, and scheme for success in the future. That is our mission here to-day. We are not only at the close of another year of the Society's existence, but near to the close of the century that gave us birth. And we may be excused should we pause, and as from an eminence survey the course we have steered since the start, a retrospect that may not always be pleasant, yet nevertheless one from which we may learn a lesson for the future.

Along the road we have travelled during the last thirty-five years we discern many places where our fellow-workers have fallen out from the ranks, and left us to carry forward the banner of Veterinary Defence and Charity. All did good work in their day and generation, yet some were more prominent than others. Need I say they bear the names of Lawson, Greaves, and Taylor. They have closed their account, but the good work they did we should not forget, but endeavour to keep their memory green, in order to stir up the spirit of emulation in the younger members of the Society.

Only recently another leader has fallen. One who was not only present at the inception of the Society, but has all along been a faithful member of Council, ever ready to give not only his wise counsel, but his valuable personal assistance to professional brethren in distress. Need I say that I allude to Professor Williams, whose death we all sincerely deplore, and express our deepest sympathy with the bereaved family.

To me, personally, he was one of my oldest friends. Our acquaintance dating from the time we met in Clyde Street, when both were struggling to learn the rudiments of the profession, which he has so much adorned and elevated. He, too, is gone to that bourne from whence no traveller returns, but the good work he has done in his lifetime will bear fruit for generations yet to come, for—

> Tell me not in mournful numbers,
> Life is but an idle dream.
> * * *
> Life is real, life is earnest,
> And the grave is not its goal ;
> Dust thou art, to dust returnest,
> Was not spoken of the soul."

With regard to the Society and its workings during the past year it is my pleasing duty to congratulate the members on its continued success. All cases brought under the notice of the executive officers having been dealt with in such a punctual and practical manner as to merit the full confidence of the members. The number of members has increased, but not in the same ratio as one would have expected, seeing the great benefits one derives from becoming a member.

The wonder to me is that every member of the profession in practice does not send entrance fee and year's subscription to the Secretary at once, and thus ease his mind from threatened assaults of cross-grained clients, or the shadow of distress, which might suddenly fall on his widow or orphans by untimely death, either from accident or disease.

The Secretary and Treasurer, in their reports, will tell you the particulars of last year's working, which you will find satisfactory.

Now that this Society has firmly established itself, we must look forward to its advancement. There must be no standing still. Some years ago I hinted at what I considered the proper thing to do, that is Federation with the whole of the Veterinary Medical Societies in the country, giving them representatives on the Council, and using their officers to make the necessary inquiries in their several districts. Such a scheme is well worth the consideration of the younger members of the profession, and my earnest hope is that some one will work it out.

As for myself, having now passed the alloted span it is my wish to retire from the proud position of President, in which you placed me, and to thank you all for the cordial support you have given me while in that position, and the many kindnesses received during my long connection with the Society, for

"Whether we smile or weep,
Time wings its flight;
Days, hours, they never creep—
Life speeds like light."

Secretary's Report.

Mr. President and Gentlemen,—In submitting my annual report I have pleasure in speaking of the continued usefulness of the Society. Your Council have met twice during the year to deliberate on several cases, but a good deal of work has been done by the executive officers, the President thinking it advisable to call as few meetings as possible, to avoid putting members of Council to much inconvenience and expense—especially those who reside some distance away. We have only had one case of defence; the Council, after hearing the evidence as produced by the defendant, resolved to defend the case. During the course of the proceedings, however, it was found that we had a very weak case, and acting under advice we settled the matter out of Court, costing the Society £40 0s. 4d. This amount would have been considerably increased but for the kindness and generosity of Geo. Thatcher, Esq., the solicitor to the R.C.V.S. whom we had engaged to defend the case. He would not make a charge (out of pocket expenses only) and also offered his services on any future occasion free of cost. I have also to acknowledge the kindness of Morton Smith, Esq., the legal adviser to the Council (London), he also would make no charge. The best thanks of the Society are due to these gentlemen.

With respect to the Benevolent branch, your Council have paid further grants—£40 to Mrs. A. L. G., widow of a late member; £3 to Mrs. K. C., widow of a non-member; £2 to Mrs. D., wife of a non-member; and £5 5s. to Mrs. H., widow of a non-member.

The membership of the Society continues to increase, during the last year 15 new members were enrolled, deaths and resignations five, the total strength being 232, a very fair membership, but nothing like what it ought to be considering the number in the profession and the great benefits the Society bestows upon its members, and in fact to all those who require assistance who are in any way connected with the profession.

I cannot close the report without referring with the deepest sorrow to the untimely death of our old friend and member of Council Professor W. Williams, who took such an active and sympathetic interest in all that appertained to the welfare of this Society. We all mourn his loss, but have the consolation of knowing that his works will long live after him.

The Treasurer, in presenting his report and balance-sheet to date, said the accounts would be audited at the end of the year, and a copy of the balance sheet forwarded to each member.

Letters were read from Mr. R. Scott, acting for the students of the New Veterinary College, Edinburgh, mooting the question of establishing some memorial to the memory of the late Professor William Williams. It was moved and resolved "That this Society is in sympathy with the desire to perpetuate the memory of the late Professor Williams, and appoint the Council to act as they deem best in any well devised scheme that may be brought forward for that purpose."

Mr. J. E. Scriven then moved the following motion, due notice of which had been given:—"That in future the Treasurer be empowered to pay from the defence fund all railway fares and other necessary expenses incurred by members of Council attending meetings of Council or acting on investigation committees."

After a full discussion on the motion, and securing the feeling of the majority of the members, Mr. Scriven asked leave to withdraw it, which was granted.

Election of Officers.

The following officers were appointed for the yea 1901:—

President.—Geo. Morgan, F.R.C.V.S., Liverpool.
Vice-President.—W. A. Taylor, F.R.C.V.S., Manchester.
Treasurer.—E. Faulkner, M.R.C.V.S., Manchester.
Hon. Sec.—Sam. Locke, M.R.C.V.S., Manchester.

Council.

J. Abson, F.R.C.V.S., Sheffield.
A. L. Butters, M.R.C.V.S., London.
J. S. Carter, F.R.C.V.S., Bradford.
T. Hopkin, F.R.C.V.S., Manchester.
A. Lawson, M.R.C.V.S., Manchester.
A. W. Mason, F.R.C.V.S., Leeds.
R. S. Reynclds, M.R.C.V.S., Liverpool.
J E. Scriven, M.R.C.V.S., Tadcaster.
R. C. Trigger, F.R.C.V.S., Newcastle-under-Lyme.
J. B. Wolstenholme, F.R.C.V.S., Manchester.
W. Woods, F.R.C.V.S., Wigan.
J. E. Kitchen, M.R.C.V.S., London.

Auditors.—Messrs. Butcher, Litton, Pownall, and J. B. Wolstenholme.

The Treasurer brought forward the subject of arrears, several members being in arrears three years. It was resolved that these gentlemen be again asked for their subscriptions, intimating that in the event of not paying before the end of the year they would be crossed off the roll of membership.

Mr. Faulkner proposed, and Mr. Mason seconded, the following motion:—"That the Secretary be instructed to forward, in the name of this Society, a letter of condolence and sympathy to the family of the late Prof. W. Williams in their sudden and sad bereavement."

Mr. Faulkner introduced the subject of "Federation," the advisability of which was suggested by the President, Mr. Morgan, some time ago. He now proposed that the Council take the first opportunity of considering the matter, to endeavour to bring same to a practical issue.

A vote of thanks to the officers for their services in the past year, and to the Chairman, closed the proceedings.

Sam. Locke, *Hon. Sec.*

COMMANDEERING 'BUS HORSES.

The reference made by the Chairman of the London Road Car Company at the last half-yearly meeting to the question of the commandeering of horses by the Government revives interest in a subject of undoubted importance. It is some years since the Administration, for the purpose of establishing an easily available depôt for remounts, formulated a scheme of registration. Under this arrangement omnibus proprietors and horse-owners generally were invited to register a certain number of the animals owned by them. On the one hand they were paid a registration fee of 10s. per annum for every horse so registered, and, on the other hand, they were bound to yield possession of as many horses as the Government thought fit to claim at a price to be mutually agreed upon at any time when the emergency arose. That arrangement has not been confined to the metropolis; it is common to the United Kingdom, and unquestionably has been of the highest value in providing many thousand seasoned animals as remounts ready to the hands of the War Office. The London Road-Car Company and the London General Omnibus Company, as being the largest holders of registered stock, have naturally been the most largely drawn on. Since the commencement of the war in South Africa the Road-Car Company has seen 1,627 of its horses requisitioned; while the London General Omnibus Company has had to provide 1,448. Other firms, such as the Star Omnibus Company, Messrs. Tilling, and so on, have in like manner had a percentage of their horseflesh commandeered for service at the front. In round numbers, it may be assumed that over 4,000 London horses, in prime condition and fit for hard, active work in the field, have been taken over by the Government in this military crisis, as a mere matter of formal arrangement made in times of peace. It is difficult to appraise the worth of such an arrangement.

Naturally the stress has not been borne by the companies without some trouble. The removal of, roughly, 10 per cent. of the working power of great omnibus companies, even though it takes place gradually, and is spread over a period of nine months, cannot fail to cause inconvenience. In the case of the Road-Car Company, many of the 'buses could only run four instead of five journeys a day, and the trips of the General Omnibus Company's 'busses were also curtailed, though to a less extent. Then, again, the replacement of seasoned horses by new blood has involved expenditure in the employment of extra brakes. These, while not commanding the same financial returns as 'buses plying over a well-known recognised route, are essential for the proper training of country-bred horses for metropolitan work. It takes from two to three months to "harden," or, in other words, to bring a horse into the physical condition necessary to enable it to stand the severe test of London traffic. And the way in which that is done is to work the horse in a brake with its lighter traffic, and occasional bursts of spurt and ease. By that means the animal is gradually trained to a pitch of excellence which gives him a high value when the time comes for mutual arrangement between the Government as purchaser and the company as seller.

Striking an average, it may be seen that each 'bus horse requisitioned by the War Office cost the Government between £50 and £55. Reliable figures are not at hand as to the first cost of the horse to the company, but it may be taken to range between £35 to £45 for a stout-built, strong, sound animal of five or six years old. Deduct the cost of his "seasoning" and of that of the others which must be bought to take his place in the stable, and which may not be disposed of to the Government, and one is able to see the wisdom of the Road-Car Company in crediting the whole of the profit made by the sale of horses to the War Office to horse renewal and capital account. Despite this process of official commandeering, the London companies have well maintained the number and excellence of their stock. According to the last half-yearly report of the London General Omnibus Company, the total number of horses owned by them on June 30th last was 16,816, as against 15,961 at the same period last year, and there has been a corresponding enterprise in renewals on the part of other 'bus proprietors.—*Daily Telegraph.*

Personal.

Mr. F. A. SIMPKIN, one of the most popular "vets' in the Shires, was unseated at some timber while hunting with Mr. Fernies, and sustained a broken collar-bone and some fractured ribs. It is by no means the first time that Mr. Simpkin has been similarly injured. Fortunately he is getting on well towards recovery at his house in Market Harborough.—*Morning Leader.*

ARMY VETERINARY DEPARTMENT.

Lieut. S. D. C. Welch, A.V.D., was discharged from hospital to duty week ended Dec. 2.

Vet.-Capt D. Crole left for England in the "Manhattan, Dec. 6.

OBITUARY.

DARNLEY C. BARNINGHAM, M.R.C.V.S., Darlington.
Graduated, Edin., December, 1898.

A telegram was received in Darlington announcing the death of Lieut. C. Barningham, of the 20th Batt. Imperial Yeomanry, suddenly, from enteric fever and heart complication, at Pretoria, on December 7th. The deceased officer was well known in Darlington, being the son of the late Mr. Nathan Barningham. His mother died at her residence, Stanhope Road, within the last few weeks, and a brother of the late officer, Mr. James Barningham, is lying very ill there at present. Mr. Thomas Barningham, solicitor, of Barnard Castle, is another brother. Mr. Darnley Barningham, who left for South Africa last March, served his articles as a veterinary surgeon with Mr. Stevens, late of Darlington, and now of Redhill, Surrey. Before leaving for the seat of war as a veterinary officer, he had charge of a London branch for Mr. Stevens. He was about 32, unmarried, and liked by all who knew him. Only about a fortnight ago Mr. Hill, of Coniscliffe Road, in whose house he spent a few hours before going to Southampton to embark, received a letter from Mr. Barningham saying he was in capital health and spirits, and thought of settling in South Africa.

The ex-Mayor of Darlington (Major T. B. Swinburne, J.P.), in responding to the toast of the "Army, Navy, and Reserve Forces" at a dinner at the Dolphin Hotel, said Vet.-Lieut. Barningham was known to a good many of them. They all sympathised with the relatives in the great loss they had sustained.

CORRESPONDENCE.

UNQUALIFIED PRACTITIONERS—A REAL GRIEVANCE.

Sir,

Looking at the Veterinary Surgeons Act of 1881, Sec. 13 (1 to 4), there seems to me no difficulty in understanding "the position of Colonial graduates of veterinary medicine." Their position as such (provided their diploma is a recognised one granted in a British possession) is impregnable under the conditions mentioned in the Act. Sec. 13 (1), reads thus: "Where a person shows that he holds some recognised veterinary diploma granted to him in a British possession, and either that the grant of such diploma occurred when he was not domiciled in

the United Kingdom or in the course of a period of not less than five years during which he resided out of the United Kingdom, or if he was practising veterinary surgery in the United Kingdom at the passing of this Act, that he has practised veterinary surgery for not less than ten years either in the United Kingdom or elsewhere, he shall upon payment of the registration fee, be entitled without examination in the United Kingdom to be registered as a Colonial practitioner in the Register of Veterinary Surgeons and to become to all intents a Member of the said Royal College."

"Sec. 13 (4). If a person is refused registration as a Colonial practitioner or as a foreign practitioner the Council of the said Royal College shall if required by that person, state in writing the reason for that refusal, and if that reason be that the veterinary diploma held or obtained by him is not a recognised veterinary diploma that person may appeal to the Privy Council, and the Privy Council after communication with the Council of the said Royal College and the appellant may either dismiss the appeal or order that Council to recognise that diploma."

Paragraph 3, Sec. 13, goes on to define a "Recognised veterinary diploma as a veterinary diploma recognised for the time being by the Council of the said Royal College as furnishing a sufficient guarantee of the possession of the requisite knowledge and skill for the efficient practice of veterinary surgery, and as entitling the holder thereof to practice veterinary surgery in the British Possession or foreign country where the diploma was granted."

From this Act it appears that all a Colonial practitioner has to do is to apply for registration after satisfying the Royal College as to his identity and qualification. Mr. Dyer need not fear that the Privy Council will order the registration of an unqualified person or that there will be any "real grievance" in putting such men on an equality with those of the Mother Country, with whom, like our Colonial troops, they are in every way qualified to serve Her Majesty

Your foot note to my letter of November 28th, Mr. Editor, in yours of December 1st, is a little rough on my intelligence and knowledge, perhaps you will now consider I have remedied both.—Yours truly,

GEO. K. POOLE, M.D.

Norwood, Dec. 10.

[The position of the foreign and colonial veterinary surgeon is not understood by our correspondent. A "recognised" school is one "recognised by the Royal College of Veterinary Surgeons" not one accepted by the country in which it exists. No Colonial veterinary school requires a standard of excellence approaching that of the R.C.V.S., and so the College refuses to "recognise" them. It is no use our trying to improve our standard if we are to admit men of far inferior calibre to all our rights and privileges. We shall certainly prosecute any person calling himself a "Veterinary Surgeon" who is not registered, whether accepted by the Army or not. Patriotism, when it supports illegal pretenders, is a degenerate sort of sentimentalism.—ED.]

THE PRELIMINARY EXAMINATION.

Dear Sir,

It may seem out of place on my part as a Councilman to write my opinion when I have every chance of verbally expressing it "on any subject brought before the Council" in its Chamber.

On Wednesday, Ootober 10th last, I was obliged to leave the Council Room immediately after Professor Dewar's address, to catch my train, one of the disadvantages of Members of Council who reside at so great a distance from London.

I was honoured by an invitation to attend the meeting of the Midland Counties Veterinary Medical Association, and deeply regret not having been able to accept it. I feel the subject "The General Education of the Veterinary Student" is such an important one, that any member of our profession who thinks at all in the matter should give vent to his ideas thereon.

I have read, and re-read, Professor M'Fadyean's address, and think the Professor has, as is his wont, handled his subject in a masterly manner.

I am one of those who would like the standard of the Preliminary Examination kept as it now stands. I should be sorry indeed to know that it was to be made lower, and I do not think it requires to be made higher. I believe the present test is sufficient to prove a young man's educational acquirements, and one who can pass it, and has common sense and tact, should be eligible after having gained his diploma not only to practice the profession he has been studying, but certainly to enter any society with which he may be surrounded. In my opinion too much stress is put upon equality with the medical profession, social position, etc.

We must remember all veterinary surgeons, no more than all other professional gentlemen, cannot be placed in same circumstances and surroundings. I am sure members of our profession whose good fortune it is to enjoy a fashionable town practice have no idea of the journeys, worry, and kind of work we poor country practitioners experience.

Veterinary Surgeon No. 1 can do his town practice in frock coat and silk hat, and quite rightly so, as he is very apt to be called whilst making his visits to consult with an employer who would be shocked to see him in breeches and boots or in an over-all frock, which is usually the dress of Veterinary Surgeon No. 2 in the agricultural district; whose employer, did he meet him in the dress of No. 1 would think the world turned upside down—bye-the-bye, I think it is somewhat.

The work of the veterinary surgeon lies in the stable or yard: when he has finished attending his case he as a rule has to wash in the kitchen unless a well appointed saddle room is at hand. The medical practitioner, whose patient is in the house, must of necessity always be in advance as his acquaintance with the family must be of a more intimate character and gains for him at once that social position which may in after years only, when he has proved himself worthy of such, be extended to the attendant upon the domestic animals.

I trust neither Professor Dewar or any other gentleman will think I wish things to stand in an unfair position, I certainly do not. Let us have a uniform test for the students of all colleges or Schools, be they English, Scotch, or Irish. If an alteration is to be made why need we follow in the wake of the medical profession? Surely the time has arrived when men belonging to the veterinary profession can be found capable of framing and placing a bye-law in the place of the present one—No. 52.

I must conclude by saying that to add to the expense of the student in any way would, I think, be a mistake, as would also to at present make the educational test more severe. By the first we are shutting out men of limited means capable of making good veterinary surgeons if they can only get through their college work and obtain their diploma; by the second too many men, not too well educated but well educated, will be entering the profestion who will think much work which must be done by veterinary surgeons derogatory to them, and so lessen the public opinion of us. I am fully persuaded this would be the case, judging from young men whom I have had from time to time with me as pupils or improvers. The boy direct from school, two years before attending college, would learn to do those things which in after life are but small, yet lack of proper knowledge of such has prevented more than one man becoming a good practitioner.—I am, sir, yours faithfully,

WM. BOWER.

THE LATE PROFESSOR WILLIAMS.

Mr. Richard Scott writes from the New Veterinary College, Edinburgh, under date November 21st, 1900, as follows:—

"Knowing that sooner or later the veterinary profession would be devising some method of perpetuating the memory of the illustrious veterinarian, Principal Williams, who did so much through his life for the profession, agriculturists, and stock-keepers in general, it was considered suitable at a general meeting of the students of the New Veterinary College that the initial proposition for such a memorial should emanate from the latter body, they being latest in close contact with Principal Williams, and that they should be allowed, if possible, to have the honour of heading the subscription list with their donation.

"I have been instructed by my fellow students to ask your co-operation in this most worthy undertaking.

"Of course I presume the profession will elect a Secretary and Treasurer and later on a committee to decide the most desirable way in which to devote the sums collected. I might remark that the *suggestion* of the students was that it should be used to form an annual bursary somewhat similar to General FitzWygram's or Professor Walley's, and should there be any surplus fund, that the latter might be devoted to erecting a bust of the late Principal in some portion of the New Veterinary College. Of course that would, however, be left for a committee elected by the profession to decide.

"We trust that this will be taken up energetically in the manner that it deserves by all the veterinary profession to which the late Principal Williams' personality and memory was, and will be, such an ornament."

DISINFECTANTS AND ABORTION.

Sir,

In executing my duties as an Inspector of Dairies and Licensed Cowsheds I have met with opposition (from a very good farmer and owner of a good stock of shorthorns) to the use of crude carbolic acid or Jeyes' black fluid being mixed in any form and applied to walls, ceilings, and stall wood, or even sprinkled near the cowsheds.

I recommend a small teacupful to a pailful of cooled thin limewash two days old, or to a pailful of pure water, limewash so mixed to be applied to walls and the water so mixed to the ceilings and stall woodwork.

The farmer's objection, or rather contention, is that it induces abortion. Can any of your readers favour me with their experience? I have consulted all local veterinary surgeons and they one and all contend that the use of the disinfectant in the way I have been favouring has the opposite tendency—to prevent abortion.

INSPECTOR.

December 10th.

NEW ZEALAND VETERINARY DEPARTMENT.

Dear Sir,

I was much interested by the report in your issue of November 24th from Mr. Gilruth, Principal Veterinary Inspector to the Government of New Zealand, and also a letter from "Practitioner" on the same subject. The prophesy thrown out by the latter has soon come true. The New Zealand Government have, through their Agent-General in London, already published an advertisement asking for from 15 to 20 qualified veterinary surgeons to proceed to the Colony to act presumably as Inspectors of meat, slaughterhouses, and stock. (*The Veterinary Record*, Dec. 8th).

I have never been in New Zealand, but I have been in Australia, where the conditions of life are similar, and as a veterinary surgeon I have conversed with many large breeders, dealers, butchers and meat exporters, so can speak with some authority on the subject.

The salary offered in this instance is the same as before, viz., £250 per annum, and passage paid outward bound.

As "Practitioner" truly says this may seem a nice income to a young struggling assistant earning little more than his board in this country. But before any young man rushes at the offer I would ask him to pause and carefully consider what he is doing, and also inquire of the Agent-General the fullest particulars. There are some advantages to be gained from accepting such a post.

1. The climate is healthy, the country beautiful, and well suited to anyone suffering from, or likely to suffer from any pulmonary complaint, either hereditary or acquired.

2. To a man who has prospects of some day becoming the possessor of a small capital, say £2,000. Because after gaining a few years experience of Colonial life and requirements, he, with his professional knowledge and aided by some ready money, may easily do well as a stock breeder.

The disadvantages are great.

1. The salary is most inadequate, little more than the wages earned by a skilled artisan.

2. The price of most necessaries and all luxuries is higher than at home bringing, according to my calculation, the real value of the £250 down to £185 per annum.

3. The prospect of advancement is practically *nil*.

I would recommend any intending applicants to write to the Emigrants Information Office, 31 Broadway, Westminster, for copies of the "New Zealand Handbook" and the "New Zealand Official Year Book," which can be had for a few pence, and which contain a great deal of valuable information about the Colony. The "Professional Handbook" of the Colonies contains the following ominous notice as to the status of veterinary surgeons in New Zealand (see p. 135).

"The law has not imposed any restriction in New Zealand on the practice of veterinary surgery. No examination has to be passed, no license is required, nor is there any official recognition of British or other qualifications."

Consequently one must not hope for much to be gained from private practice in a country where qualifications are not recognised and quackery goes rampant.

During the busy season the work is hard, the hours long, and the surroundings (that is when on duty in slaughterhouses) hardly pleasant.

I must apologise for taking up so much space Mr. Editor, but hope you will find room for my letter, as I am sure many young men may easily make the disastrous mistake of taking one of these appointments, and after a few months experience wish themselves home again, but finding it impossible to save up enough to pay their passage out of their generous salary, paid by a Government prosperous enough now to pay a good price for good work.

—Yours truly,

COLONIAL.

[On the other side it should be remembered that men who have gone out are still there, and that no general complaint has been made by them.—ED.]

NO CASE.

We have received another letter from Mr. Dollar, but as it consists only of personal abuse and offers no answer to Mr. Gray's question we decline to afford any more space to the subject.

EDITOR.

COMMUNICATIONS, BOOKS, AND PAPERS RECEIVED:—Capt. Hayes, Surg.-Maj. G. K. Poole. Messrs. W. Mole, S. Locke, H. Leeney, Jno. A. W. Dollar, J. D. Allman. "Colonial." *The Carlisle Patriot*, *The Manchester Evening Chronicle*, *The East Cumberland News*, *The Evening Journal* (Carlisle).